

## PATENT COOPERATION TREATY

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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY  
(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 2032575PC/nu	FOR FURTHER ACTION See Form PCT/IPEA/416	
International application No. PCT/FI2005/000061	International filing date (day/month/year) 28-01-2005	Priority date (day/month/year) 30-01-2004
International Patent Classification (IPC) or national classification and IPC See Supplemental Box		
Applicant Elektrobit Testing OY et al		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 5 sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:
  - a. ☒ (sent to the applicant and to the International Bureau) a total of 6 sheets, as follows:
    - ☒ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
    - ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
  - b. ☐ (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) \_\_\_\_\_, containing a sequence listing and/or tables related thereto, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

- |                                     |              |                                                                                                                                                                 |
|-------------------------------------|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input checked="" type="checkbox"/> | Box No. I    | Basis of the report                                                                                                                                             |
| <input type="checkbox"/>            | Box No. II   | Priority                                                                                                                                                        |
| <input type="checkbox"/>            | Box No. III  | Non-establishment of opinion with regard to novelty, inventive step and industrial applicability                                                                |
| <input type="checkbox"/>            | Box No. IV   | Lack of unity of invention                                                                                                                                      |
| <input checked="" type="checkbox"/> | Box No. V    | Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement |
| <input type="checkbox"/>            | Box No. VI   | Certain documents cited                                                                                                                                         |
| <input type="checkbox"/>            | Box No. VII  | Certain defects in the international application                                                                                                                |
| <input type="checkbox"/>            | Box No. VIII | Certain observations on the international application                                                                                                           |

Date of submission of the demand  21-11-2005	Date of completion of this report  10-04-2006
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Form PCT/IPEA/409 (cover sheet) (April 2005)

# INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/FI2005/000061

## Box No. I Basis of the report

1. With regard to the language, this report is based on:

- ☒ the international application in the language in which it was filed  
☐ a translation of the international application into \_\_\_\_\_  
 which is the language of a translation furnished for the purposes of:  
☐ international search (Rules 12.3(a) and 23.1(b))  
☐ publication of the international application (Rule 12.4(a))  
☐ international preliminary examination (Rules 55.2(a) and/or 55.3(a))

2. With regard to the elements of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report):*

- ☐ the international application as originally filed/furnished  
☒ the description:  
 pages 1-12 as originally filed/furnished  
 pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_  
 pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_  
☒ the claims:  
 pages \_\_\_\_\_ as originally filed/furnished  
 pages\* \_\_\_\_\_ as amended (together with any statement) under Article 19  
 pages\* 13-18 received by this Authority on 20-11-2005  
 pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_  
☒ the drawings:  
 pages 1/5-5/5 as originally filed/furnished  
 pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_  
 pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_  
☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages \_\_\_\_\_  
☐ the claims, Nos. \_\_\_\_\_  
☐ the drawings, sheets/figs \_\_\_\_\_  
☐ the sequence listing (*specify*): \_\_\_\_\_  
☐ any table(s) related to the sequence listing (*specify*): \_\_\_\_\_

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

- ☐ the description, pages \_\_\_\_\_  
☐ the claims, Nos. \_\_\_\_\_  
☐ the drawings, sheets/figs \_\_\_\_\_  
☐ the sequence listing (*specify*): \_\_\_\_\_  
☐ any table(s) related to the sequence listing (*specify*): \_\_\_\_\_

\* If item 4 applies, some or all of those sheets may be marked "superseded."

# INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/FI2005/000061

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

## 1. Statement

Novelty (N)	Claims	<u>1-27</u>	YES
	Claims		NO
Inventive step (IS)	Claims	<u>1-27</u>	YES
	Claims		NO
Industrial applicability (IA)	Claims	<u>1-27</u>	YES
	Claims		NO

## 2. Citations and explanations (Rule 70.7)

The invention relates to a method and a system for testing a receiver of a wireless messaging device. The primary object of the invention is to reduce the testing time, which is achieved by making the tested device synchronize faster to the test equipment. This is accomplished by sending a test signal containing physical time slots, at least one of which is allocated to the transmission of system information, and to position a synchronization sequence in a time slot allocated to the transmission of system information.

Documents cited in the International Search Report:

D1: WO 03075590 A1  
D2: EP 1363471 A2  
D3: US 5361402 A1  
D4: GB 2322043 A

Document D1 is considered to represent the closest prior art. D1 describes a method and a system for testing mobile telephone terminals, in which a tested mobile telephone is connected to the test equipment by cable or RF connection. In order to make the mobile terminal synchronize to the test equipment, the test equipment transmits a signal comprising system information to the mobile terminal, using a Broadcast Control Channel. According to the document, elements constituting the BCCH are the Frequency Control Channel (FCCH), the Synchronization Channel (SCH) and System Information Message.

The invention according to the amended claim 1 differs from the method in D1 by generating, in a production stage of the wireless messaging device,...

.../...

## Supplemental Box

In case the space in any of the preceding boxes is not sufficient,  
Continuation of: Box V

..a test signal comprising physical time slots, at least one of which is allocated to the transmission of system information, and that a synchronization sequence is positioned in a time slot allocated for the transmission of system information.

Due to these features, a more rapid synchronization between the messaging device and the test equipment is achieved.

Document D2 describes a method for cell synchronization in which the FCCH and SCH are included in each time slot in a frame of the forward BCCH. The method described aims at reducing the cell selection time by performing a reception power measuring operation and a forward channel demodulation operation simultaneously.

D3 describes a prior-art test device for analyzing transmission parameters in communication channels in a trunked radiosystem.

D4 shows a method for allocating channels in a TDMA system.

D3 and D4 only refer to the general prior-art and have not been used in the examination process.

The invention as claimed in the amended claims therefore differs from the cited prior-art, and therefore has novelty.

A person skilled in the art and aware of the closest prior-art as described in D1 and faced with the problem of developing a method for testing a wireless messaging device, which method achieves a rapid synchronization between a test transmitter and a receiver in the wireless messaging device, would not use the teachings of D2 together with the teachings of D1. The reason for this is the lack of system information that would arise in the system according to D1 due to the incorporation of synchronization sequence in a BCCH frame, as suggested in D2.

The invention as claimed in the amended claims therefore show inventive step.

The invention is also considered to have industrial applicability.

AMENDED CLAIMS 24.10.2005

1. A method for testing a receiver of a wireless messaging device of a mobile communication system, comprising

generating (604), in a production stage of the wireless messaging device, a test signal which contains physical time-slots, at least one of which is allocated for transmission of system information from a base transceiver station of the mobile communication system to the messaging device,

**characterized by**

positioning (606) a synchronization sequence supported by the mobile communication system in a time-slot allocated for transmission of system information.

2. A method according to claim 1, **characterized by** converting (608) the test signal to radio frequency; and transmitting (610) the test signal to the receiver at the radio frequency.

3. A method according to claim 1, **characterized by** positioning (606) a frequency synchronization sequence supported by the mobile communication system in a time-slot allocated for transmission of system information;

identifying (720) the frequency synchronization sequence from the test signal; and

frequency-synchronizing (722) the receiver by means of the frequency synchronization sequence.

4. A method according to claim 1, **characterized by** positioning (606) a time synchronization sequence supported by the mobile communication system in a time-slot allocated for transmission of system information;

identifying (726) the time synchronization sequence from the test signal; and

time-synchronizing (728) the receiver by means of the time synchronization sequence.

5. A method according to claim 1, **characterized by** positioning (606) a frequency synchronization sequence supported by the mobile communication system in the first time-slot allocated for transmission of system information; and

positioning (606) a time synchronization sequence supported by the mobile communication system in the second time-slot allocated for transmission of system information in such a way that the interval between the front edge of the first time-slot and the front edge of the second time-slot is 8 time-slots.

6. A method according to claim 1, **characterized** by generating (604) a test signal containing a 51-frame multi-frame, which has a plurality of time-slots allocated for transmission of system information; and

positioning (606) synchronization sequences supported by the mobile communication system in time-slots allocated for transmission of system information in such a way that the synchronization sequence is repeated at least 11 times in the 51-frame multi-frame.

7. A method according to claim 1, **characterized** by positioning (702) a test sequence in the test signal;

receiving (704) the test signal;

identifying (706) the test sequence from the test signal;

generating (708) a variable characterizing the receiver by means of the test sequence;

transmitting (710) a signal containing the receiver-characterizing variable from the wireless messaging device; and

receiving (712) the signal containing the receiver-characterizing variable from the wireless messaging device.

8. A method according to claim 1, **characterized** by positioning (606) a synchronization sequence supported by the mobile communication system in a time-slot allocated for transmission of system information, which synchronization sequence contains at least one of the following: the training sequence code of a synchronization channel (SCH) according to the GSM standard; bits of a frequency correction channel (FCCH) according to the GSM standard.

9. A method according to claim 1, **characterized** by transmitting (610) the test signal to the receiver via an antenna connection of the receiver.

10. A method according to claim 1, **characterized** by loading (602) to the wireless messaging device a computer program which executes a computer process comprising the steps of:

receiving the test signal as input;

identifying the synchronization sequence from the test signal; and  
synchronizing the receiver by means of the synchronization  
sequence.

11. A method according to claim 1, **characterized** by  
identifying (612) the synchronization sequence from the test signal; and  
synchronizing (614) the receiver by means of the synchronization  
sequence.

12. A system for testing a receiver of a wireless messaging device  
of a mobile communication system, comprising

a test-signal generator (102) for generating a test signal (106) in a  
production stage of the wireless messaging device, which test signal (106)  
contains physical time-slots (4A to 4J), at least one of which time-slots (4A, 4J)  
is allocated for transmission of system information from a base transceiver  
station of the mobile communication system to the messaging device (112),  
**characterized** in that

the test-signal generator (102) is configured to position a  
synchronization sequence supported by the mobile communication system in a  
time-slot (4A, 4J) allocated for the transmission of system information.

13. A system according to claim 12, **characterized** in that  
the system further comprises:

conversion means (104) connected to the test-signal generator  
(102) for converting the test signal (106) to radio frequency; and

transmission means (110) connected to conversion means (104) for  
transmitting the test signal (106) to the receiver at the radio frequency.

14. A system according to claim 13, **characterized** in that  
the transmission means (110) are connected to an antenna connector of the  
wireless messaging device.

15. A system according to claim 12, **characterized** in that  
the test-signal generator (102) is configured to position one of the following in a  
time-slot (4A, 4J) allocated for transmission of system information: a time  
synchronization sequence supported by the mobile communication system, a  
frequency synchronization sequence supported by the mobile communication  
system.

16. A system according to claim 12, **characterized** in that  
the test-signal generator (102) is configured to position a frequency

synchronization sequence supported by the mobile communication system in the first time-slot (4A) allocated for transmission of system information; and

that the test-signal generator (102) is configured to position a time synchronization sequence supported by the mobile communication system in the second time-slot (4J) allocated for transmission of system information in such a way that the interval between the front edge of the first time-slot and the front edge of the second time-slot is 8 time-slots.

17. A system according to claim 12, **characterized** in that the test-signal generator (102) is configured to generate a test signal (106) containing a 51-frame multi-frame (500), which has a plurality of time-slots (5C, 5D) allocated for transmission of system information; and

the test-signal generator (102) is configured to position synchronization sequences supported by the mobile communication system in time-slots (5C, 5D) allocated for transmission of system information in such a way that the synchronization sequence is repeated at least 11 times in the 51-frame multi-frame.

18. A system according to claim 12, **characterized** in that the test-signal generator (102) is configured to position in the test signal (106) a test sequence, of which the receiver generates a variable characterizing the receiver.

19. A system according to claim 12, **characterized** in that the test-generator (102) is configured to position a synchronization sequence supported by the mobile communication system in a time-slot (4A, 4J) allocated for transmission of system information, which synchronization sequence contains at least one of the following: the training sequence code of a synchronization channel (SCH) according to the GSM standard; bits of a frequency correction channel (FCCH) according to the GSM standard.

20. A system according to claim 12, **characterized** in that the system further comprises a connection unit (134) for receiving from the wireless messaging device a signal (126) that contains a variable characterizing the receiver.

21. A system according to claim 12, **characterized** in that the system comprises a loading unit (144) for loading a computer program to the wireless messaging device, which computer program executes a computer process comprising the steps of:

receiving the test signal as input;



identifying the synchronization sequence from the test signal; and  
synchronizing the receiver by means of the synchronization  
sequence.

22. A computer program for executing a computer process for  
testing a receiver of a wireless messaging device of a mobile communication  
system, the computer process being **characterized** in that it comprises  
the steps of:

receiving (610B), in a production stage of the wireless messaging  
device, as input a test signal containing physical time-slots, at least one of  
which is allocated for transmission of system information from a base  
transceiver station of the mobile communication system to the messaging  
device, a synchronization sequence supported by the mobile communication  
system being positioned in this time-slot;

identifying (612) the synchronization sequence from the test signal;  
and

synchronizing (614) the receiver by means of the synchronization  
sequence.

23. A computer program according to claim 22,  
**characterized** in that the computer process comprises:

receiving (718) the test signal as input, a frequency synchronization  
sequence being positioned in at least one of its time-slots allocated for  
transmission of system information;

identifying (720) the frequency synchronization sequence from the  
test signal; and

frequency-synchronizing (722) the receiver by means of the  
frequency synchronization sequence.

24. A computer program according to claim 22,  
**characterized** in that the computer process comprises the steps of:

receiving (724) the test signal as input, a time synchronization  
sequence being positioned in at least one of its time-slots allocated for  
transmission of system information;

identifying (726) the time synchronization sequence from the test  
signal; and

time-synchronizing (728) the receiver by means of the time-  
synchronization sequence.

25. A computer program according to claim 22, **characterized** in that the computer process comprises:

receiving (610B) as input a test signal which contains a 51-frame multi-frame with a plurality of time-slots allocated for transmission of system information, synchronization sequences supported by the mobile communication system being positioned in time-slots in such a way that repetition of the synchronization sequence in the 51-frame multi-frame is at least one of the following: 7 times, 11 times; and

synchronizing (614) the receiver by means of the synchronization sequences.

26. A computer program according to claim 22, **characterized** in that the computer process comprises:

receiving (704) as input the test signal that contains a test sequence;

identifying (706) the test sequence from the test signal;

generating (909) a variable characterizing the receiver by means of the test sequence; and

outputting (710) the signal containing the receiver-characterizing variable to an external bus of the wireless messaging device.

27. A computer program according to claim 22, **characterized** in that the computer process comprises receiving (610B) as input the test signal that contains physical time-slots, at least one of which time-slots is allocated for transmission of system information from the base transceiver station to the messaging device, and in which time-slot a synchronization sequence supported by the mobile communication system is positioned, the synchronization sequence comprising at least one of the following: the training sequence code of a synchronization channel (SCH) according to the GSM standard; bits of a frequency correction channel (FCCH) according to the GSM standard.